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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/507,001

09/08/2004

Otto Machhammer

257569US0PCT

8863

22850 7590 01/17/2007

OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C.

1940 DUKE STREET

ALEXANDRIA, VA 22314

EXAMINER

BULLOCK, IN SUK C

ART UNIT

PAPER NUMBER

1764

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

01/17/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/507,001

Applicant(s)

MACHHAMMER ET AL.

Examiner

In Suk Bullock

Art Unit

1764

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 September 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 and 12-14 is/are rejected.
- 7) ☒ Claim(s) 11 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 September 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>9/8/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 12 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 12 recites the limitation "the second circulating gas". There is insufficient antecedent basis for this limitation in the claim. It would appear that the claim should depend on claim 11 and not claim 1.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-10, 13, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 6,518,476 to Culp et al. (hereinafter "Culp") in view of WO 98/29365 (US Patent 6,576,804 will be used for translation of the WO reference).

Culp discloses oxidative dehydrogenation of lower alkane, i.e., propane, comprising: (1) supplying at least one lower alkane; (2) providing a source of oxygen; (3) converting a portion of the lower alkane to produce unconverted lower alkane containing at least one olefin product, at least one alkane byproduct, and water; (4) removing water from the converted lower alkane; (5) recovering at least one olefin product from the unconverted lower alkane; and (6) recycling after steps (4) and (5) a majority of the unconverted lower alkane which contains the at least one alkane byproduct, and hydrogen, to the process step (3). See column 5, lines 42-61; column 9, lines 29-51; column 12, lines 60-62; column 13, lines 56-67; and column 20, lines 49-63.

Culp fails to disclose dividing the product gas from the oxidative dehydrogenation reaction into two substreams of identical composition and recycling one of the two substreams.

Culp discloses removing at least one olefin from the unconverted lower alkane which would lead one to believe that there are some olefins still contained in the recycle stream which contains unconverted lower alkane, alkane byproduct, and hydrogen. It is also expected that some water would be contained in the recycle stream because Culp also discloses that water content is not completely removed from the product stream product prior to recycling (col. 21, lines 50-55). Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Culp and explicitly divide the product gas stream into two substreams of identical composition because the recycle stream in the Culp process is similar to the claimed recirculated substream.

Culp also fails to disclose dehydrogenation catalysts as called for in claim 2.

The US Patent 6,576,804 discloses dehydrogenation of propane in the presence of a catalyst comprising zirconium oxide, at least one element of transition group VIII and or an element of transition group VI, an alkali metal or alkaline earth metal, and an element of transition group III (see Abstract and col. 2, lines 1-22). The catalyst can be used in a fixed bed and in various forms such as extrudates or ring (col. 3, lines 10-14).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Culp by using the catalyst disclosed by US Patent 6,576,804 because the US Patent has taught that the catalyst

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have the advantage of higher selectivity with simultaneous higher conversion in the dehydrogenation of propane to propylene. Further, the catalyst can be operated without additional hydrogen which would otherwise have to be used for suppressing the formation of carbon deposits. Other advantages are high mechanical strength, high operating lives, and easy shaping. See column 2, lines 37-45.

With respect to the claimed partial oxidation and/or amoxidation of the dehydrogenated hydrocarbon as called for in claim 10, Culp discloses that olefins such as propylene are valuable feed for producing petrochemical products (col. 1, lines 25-29). Thus, it would have been obvious to one having ordinary skill in the art to have taken the product produced in the dehydrogenation process for further processing downstream such as oxidation and amoxidation to produce other intermediate and final products.

Allowable Subject Matter

Claim 11 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: adding a second recirculating gas coming from partial oxidation and/or amoxidation of the dehydrogenated hydrocarbon is not fairly disclosed or suggested by the prior art.

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Claim 12 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to In Suk Bullock whose telephone number is 571-272-5954. The examiner can normally be reached on Monday - Friday 6:00-2:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 571-272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


I.B.


Glenn Caldarola
Supervisory Patent Examiner
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